Our census and survey programs and products are our core business. New technologies, research, special initiatives, and support activities must contribute to improved programs and should be evaluated in terms of their contribution. Our goal is to have the U.S. Census Bureau's economic statistics programs recognized as the most relevant, responsive, cost-competitive, and highest quality statistical programs in the United States.

The Economic program area proactively seeks the support of their data providers and suppliers. We are responsive to our data supplier's environment, record-keeping practices, and their confidentiality concerns. We aggressively pursue electronic data collection and identify ways to reduce reporting burden while also satisfying our program mandates. We pursue initiatives such as data sharing, increased use of auxiliary and administrative information, and identifying innovative ways to provide information without imposing reporting burden.

The Economic program area will provide information that is relevant, timely, accessible, and satisfies customer requirements. Our product line is dynamic, reflecting changes in economic structure, business operations, and customer demand. We review the product line each year and drop products that are no longer relevant. We actively seek innovative ways to add value to our products.

The North American Industry Classification System (NAICS) is replacing the existing Standard Industrial Classification system. NAICS will make substantial structural improvements and identify new industries. Not only does this system identify new industries, but it also reorganizes the system according to a more consistent economic principle (according to types of production activities performed) rather than the mixture of production-based and market-based categories. The reorganization will allow us to present more detail for the rapidly expanding service sector that accounts for most economic activity. Furthermore, we worked with representatives from Canada and Mexico to redefine the system so that we could obtain comparable statistics for the three North American Free Trade Agreement partners.

The 1997 Economic Census had a unique role in supporting the move to NAICS. Only the census gathers the comprehensive detail needed to conclusively determine industry classifications for all establishments. Also, the 1997 Economic Census allowed us to highlight the interrelationships between the old and new classification systems. In 1999 we will release the first data with NAICS codes from the 1997 Economic Census.

Following the 1997 Economic Census, we began converting our current economic surveys to NAICS; we will complete all surveys by 2001.

The Economic program area's microdata is a valuable resource. We will build on the accomplishments of the Center for Economic Studies work with the Longitudinal Research Database, extend this effort to non-manufacturing sectors, and seek innovative ways to make this information more accessible and useful to policy makers and other important users.

The Economic program area will assess businesses' and key stakeholders' attitudes about confidentiality-related issues and recommend policy changes as appropriate. Currently, little information is available about our respondents' attitudes on

Trade Monitoring. It includes data analysis as well as collection methodologies and data processing functions. Foreign Trade Division delivers quality data products and analysis to help build and evaluate informed public policies.

Governments Census and Surveys

The Governments Division compiles statistics on the public sector of the economy. We conduct a complete Census of Governments to gather benchmark data on the characteristics of state and local governments. These censuses focus on the finances, employment, taxation and governmental organizational structure of the nation's 83 thousand state and local governments. Annual sample surveys of state and local government finances and employment supplement the census data. These surveys provide comparative statistics for states and sizable cities, counties, and school systems; uniformly-classified nationwide totals; and state and local totals.

Office of the Chief Economist

The Office of the Chief Economist supports economic measurement and evaluation activities at the U.S. Census Bureau. This support consists of a program of analyses and research that result in improved and better quality economic measures. The Office also provides access to non-publicly available census microdata to analysts from both the public and private sectors. Currently, it maintains research data centers in Massachusetts, Pennsylvania, and California, and at Headquarters in Suitland, Maryland.

Our economic research agenda includes programs on environmental issues, organization and behavior of firms and markets, productivity and technical changes, economic growth, regional issues, capacity use, and labor. The results of these programs are included in monographs, position papers, scholarly papers for economic and statistical journals, and presentations at conferences. Individual researchers undertake and/or direct major statistical/econometrics research studies of a special nature concerning the use, applicability, reliability, and accessibility of U.S. Census Bureau economic microdata.

Our researchers develop new theoretical approaches to economic measurement and analysis issues, and modify the innovations of other researchers to fit the topics at hand. We assess the appropriateness of alternative measurement frameworks proposed in the economic literature for the purposes of U.S. Census Bureau survey and measurement activities. We make sure to understand the implications of new techniques and to incorporate them into the design of U.S. Census Bureau surveys and the processing and analysis of these and related data.

Our researchers and computer specialists build, document, and maintain a broad array of U.S. Census Bureau microdata. These data sets include both establishment and firm-level data from such sources as the Economic Census, the Annual Survey of Manufactures, and the Standardized Statistical Establishment Listing; also included are demographic data from the Decennial Census, the Current Population Survey, and the Crime Victimization Survey. Our main objectives in these endeavors are to improve access to U.S. Census Bureau microdata, to archive and preserve original data files, and to support research both within and outside of the Center for Economic Studies.

Foreign Trade Statistics

Government officials, analysts, and market researchers use foreign trade data—information that describes the value, volume, and composition of commodities in international trade plus the economic value of services—to make many critical commercial and political decisions.

The Foreign Trade Division (FTD) provides applicable statistical data to agencies such as:

- **the Department of State;**
- **the Department of Agriculture;**
- **the Department of Commerce;**
- **the Department of Energy;**
- **the Bureau of Export Analysis;**
- **the Central Intelligence Agency;**
- **the U.S. Customs Service;**
- **the Army Corps of Engineers;**
- **the Maritime Administration;**
- **the Federal Maritime Commission;**
- **the International Trade Commission;**
- **the Office of the United States Trade Representative;**
- **the Bureau of Economic Analysis;**
- **StatUSA; and**
- **Statistics Canada.**

Data received by these agencies assist them in fulfilling their responsibilities. Figure 1, on the following page, depicts the organizations that use our data.

We explain the three major aspects—Import Statistics, Export Statistics, and Trade Monitoring—of Foreign Trade Division's data below.

Import Statistics

The Import Statistics program focuses on compiling monthly foreign trade import statistics from information filed with the U.S. Customs Service. Import statistics are compiled for shipments valued over $2,000 (under $251 where applicable). Statistics for low value shipments that were not filed are developed for individual countries through a statistical estimating procedure.

Transactional Import Data Used

Program Output	Sample Size	Universe
Monthly & Annual Import Trade Statistics	All import transactions over $2000 (over $250 where applicable)	2.4 million records per month

Data Users and how they use Import Statistics

Data Users	Use of Import Statistics
Bureau of Economic Analysis, Council of Economic Advisers, Federal Reserve Board, and Department of Treasury	Develop the import components of the merchandise trade figures for the balance of payments and Gross Domestic Product accounts
U.S. Trade Representatives	Negotiate and measure the effect of tariff and trade concessions under the General Agreement on Tariffs and Trade
U.S. Department of Commerce	Implement and monitor international agree-ments such as the U.S./Canadian Free Trade Agreement as well as bilateral agreement on quotas for textiles, steel, meat, footwear, and television sets
U.S. International Trade Commission	Measure the effect of U.S. tariffs on import levels. Measure effect of import trade on the U.S. market and domestic industry
Private sector	Analyze product and market development, share-of-the-market, and market penetration

Trade Monitoring

The Trade Monitoring program covers the Foreign Trade Division's responsibilities, through the U.S. Census Bureau, under the Trade Act of 1974. Trade Monitoring is laid out in Section 608 (Uniform Statistical Data on Imports, Exports, and Production), Title V (Generalized System of Preference), and Section 282 (Trade Monitoring System). The commodity classification systems are revised on a regular basis to reflect changing statistical needs and to improve comparability of trade and domestic production data as well as the comparison of trade data between the United States and other countries.

The monthly and cumulative year-to-date import statistics summarize imported merchandise in terms of commodity classifications of the Harmonized Tariff Schedules of the United States and are annotated by country of origin and by customs district of entry. The merchandise import summary statistics are adjusted to a Balance of Payments basis combined with imports of services statistics. The Bureau of Economic Analysis provides information for these adjustments.

The monthly and cumulative year-to-date merchandise export statistics summarize exported merchandise in terms of commodity classifications of Schedule B "Statistical Classification of Domestic and Foreign Commodities Exported From The United States", by country of destination, and by customs district of exportation. Like imports, the merchandise export summary statistics are adjusted to a Balance of Payments basis, combined with exports of services statistics. Again, like imports, the Bureau of Economic Analysis provides information for these adjustments.

The summary import and export merchandise statistics described above are published in a monthly, joint U.S. Census Bureau and Bureau of Economic Analysis Foreign Trade press release.

Governments Census and Surveys

The Governments Division is involved with a variety of reimbursable projects for several government agencies. This division supports the following data collection and statistical activities:

- **We conduct a Census of Governments every five years. These censuses focus on the finances (revenues, expenditures, debt, and cash and security holdings) and employment of all governments, property assessments, and taxation and governmental organizational structure.**

(continued)

- **Annual Surveys supplement the Census of Governments and provide current national data. Data are provided about state and local government finances and employment through annual sample surveys. From these surveys, annual publications and reports are produced depicting changes in various components of state and local governmental activities.**

Data collected from the Census of Governments and annual surveys are used primarily by our major client, the Bureau of Economic Analysis, for constructing National Accounts and for statistical reports. Data

depending on the length of the project, the frequency of facility use, and the complexity of the data request.

To support this access to microdata, the Office of the Chief Economist creates, maintains, updates, and makes available survey microdata. A key part of this database development is creating longitudinal business data sets for microanalysis. This Office also provides computer, database, and analytical technologies to clients within the U.S. Census Bureau. In addition, the Office staff uses the knowledge we gain by analyzing the microdata to provide subject matter expertise to operational divisions in the Economic Directorate.

1.2 Economic Program Area IT Objectives

The Economic Directorate's overarching IT goal to provide a flexible computing environment to help re-engineer and constantly improve our business processes and products. We seek to make maximum and efficient use of our IT resources to meet our programmatic objectives. To accomplish our IT objectives, we will:

- **reduce software development time and IT maintenance and support costs;**
- **develop new processing systems that are hardware and operating system independent;**
- **ensure that all production systems and subsystems are Y2K compliant;**
- **ensure that all critical processing systems are fault-tolerant, with adequate hardware and telecommunication redundancy;**
- **provide analysts with enhanced data access and standard tools;**
- **foster innovation and be selective in how we apply technology to ensure that it responds to customer and programmatic requirements and is cost-beneficial;**
- **ensure that technology meshes with existing and future staff competencies;**
- **finish the refreshing our technology to ensure that our growing number of research projects have sufficient CPU and disk resources support;**
- **structure our computing environment for maximum flexibility by standardizing on an open systems hardware and networking environment; and**
- **strive to provide access to more historical data and documentation in a common, user-friendly format.**

We will accomplish those IT objectives by:

- **providing a common, integrated framework for processing and analysis by making maximum use of SAS software;**
- **adopting best practices for developing software lifecycles;**
- **implementing generalized processing solutions to satisfy common processing requirements;**
- **standardizing the desktop and Local Area Network operating systems and software;**
- **providing standard software products that the Economic or IT Directorates can adequately support;**
- **maintaining a stable, secure and flexible DEC computing environment;**
- **maintaining a stable, secure and flexible Local Area Network environment;**
- **attacking the most costly and resource intensive activities;**
- **not investing in incremental improvements; and**
- **retaining and strengthening core staff competencies and contracting out for specialized skills.**

Several major systems comprise the IT environment that supports Economic Surveys and Surveys processing. Our large-scale systems, located in the Bowie Computer Center, are clustered DEC Alpha minicomputers running both the OpenVMS and UNIX operating systems. These machines are primarily managed and administered by Bowie Computer Center staff and contractors, with assistance from the Economic Statistical Methods and Programming Division's Database Staff.

The hardware configuration for these systems includes five DEC 8400 and three DEC 4100 large-scale minicomputers with upgraded memory and processors. In addition, these systems drive numerous peripheral equipment such as printers, magnetic tape cartridge silos (for backup), and a large disk farm (over four terabytes). To support the many production applications, we have also acquired various commercial software packages: these include a CASE tool, database software, software development tools, statistical analysis and online analytical processing tools. We execute our major processes—including data capture, data edit, interactive review, analysis and correction, tabulation (including disclosure suppression) and publication—on these systems. At peak, our configuration can support over 1,000 concurrent users as well as background batch processing and nightly backup operations. These systems support our goal of using equipment that is modular in architecture, scalable, standards-based, redundant, and sufficiently flexible and powerful enough to support a variety of different applications.

Our major plans over the next several years for our DEC systems include:

- **redesigning the Standard Statistical Establishment List;**
- **redesigning the 2002 Economic Census processing;**
- **deploying the Standard Economic Processing System and the Time Series Analytical Repository for survey processing on our DEC UNIX system;**
- **upgrading our DEC UNIX hardware so it can support the migration of major applications to this platform and the redesign of applications with more sophisticated tool sets for analysts;**
- **deploying enterprise backup for our DEC Open VMS and DEC UNIX systems; and**
- **developing and deploying adequate redundancy and failover capability for the DEC UNIX system.**

These DEC systems support the following strategies described in the 1999 Strategic Information Technology Plan (SITP):

- **Strategy 2: Improve the operating environment by consolidating appropriate computer processing equipment in the state-of-the-art Bowie Computer Center;**
- **Strategy 5: Improve and expand electronic survey data collection, capture, and processing systems; and**
- **Strategy 8: Redesign legacy systems to operate in an open systems envrionment.**

Our Local Area Network (LAN) is a component of the U.S. Census Bureau's enterprise telecommunications infrastructure. The Headquarters Telecommunications Office provides the primary LAN-related cabling plant and routing/switching support. The LAN staff in the Economic Statistical Methods Programming Division centrally administers the LAN environment supporting all the divisions that process the Economic Census and the large majority of economic surveys. This environment consists of 22 production servers, three office

Foreign Trade Statistics

Currently, all production processing, office automation, management, analysis, data sharing, and product generation functions are LAN-based.

Governments Census and Surveys

Governments Divisions programs are supported by the Local Area Network infrastructure. There are no major IT systems.

Office of the Chief Economist

The policy of the Office of the Chief Economist is to use commercial off-the-shelf software such as SAS and Oracle, and POSIX-compliant (UNIX-based) computer systems from vendors such as Hewlett Packard and Sun Microsystems. To the extent possible we will acquire these products through U.S. Census Bureau enterprise contracts and other government contracts such as The National Aeronautics and Space Administration's Scientific Engineering Workstation Procurement II.

We have designed the Office's computing environment to be as simple, flexible, and scalable as possible. Each computer is dedicated to a certain task; these include the following:

- **serving as the sole machine for a client with a long-term research contract (such as the Federal Reserve or the Department of Agriculture;**
- **meeting the processing needs of short-term outside research projects;**
- **acting as a computer and data server for U.S. Census Bureau economists; and**
- **serving as mail/print/DNS server for the entire Office of the Chief Economist's network.**

In our ongoing effort to ensure that IT resources are being properly used, the Office's computer staff collects and analyzes accounting data from all workstations and servers; this is to ensure that the processing and analysis load is evenly distributed among machines. We do much of this analysis using SAS Institute's IT Service Vision product.

During FYs 1998 and 1999, the Office of the Chief Economist continued its migration to its second-generation open systems environment. We have replaced all of the HP workstations purchased in the early 1990s with new equipment from Sun Microsystems. The ease of this effort has proved to us that while an initial move to open systems may be costly and time-consuming, replacing standards-based, POSIX-compliant computers with others just as "open" is an almost trivial task.

One other critically needed enhancement we completed early in FY 99 was upgrading the Office of the Chief Economist network from 10Mb to 100 Mb capacity; this was vital to support rapid movement of data extracts between computers, as well as to ensure the success of the Economic Microdata Warehouse prototype project.

2.1 IT System Descriptions

2.1.1 Detailed Description of Systems

Economic Census and Surveys

The following figures depict the Economic Directorate's DEC configuration in the Bowie Computer Center.

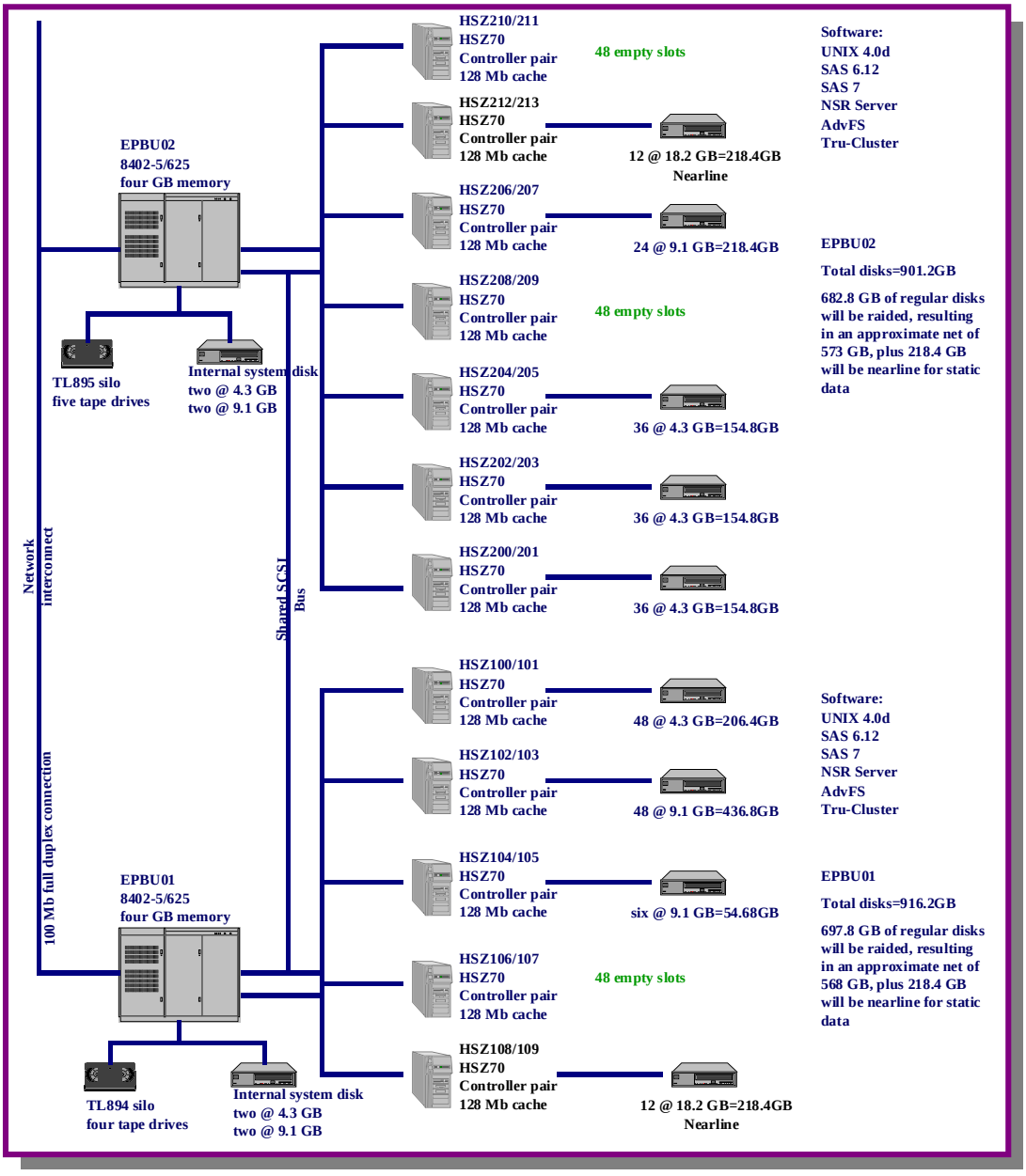


Figure 3: UNIX Production Tru-Cluster

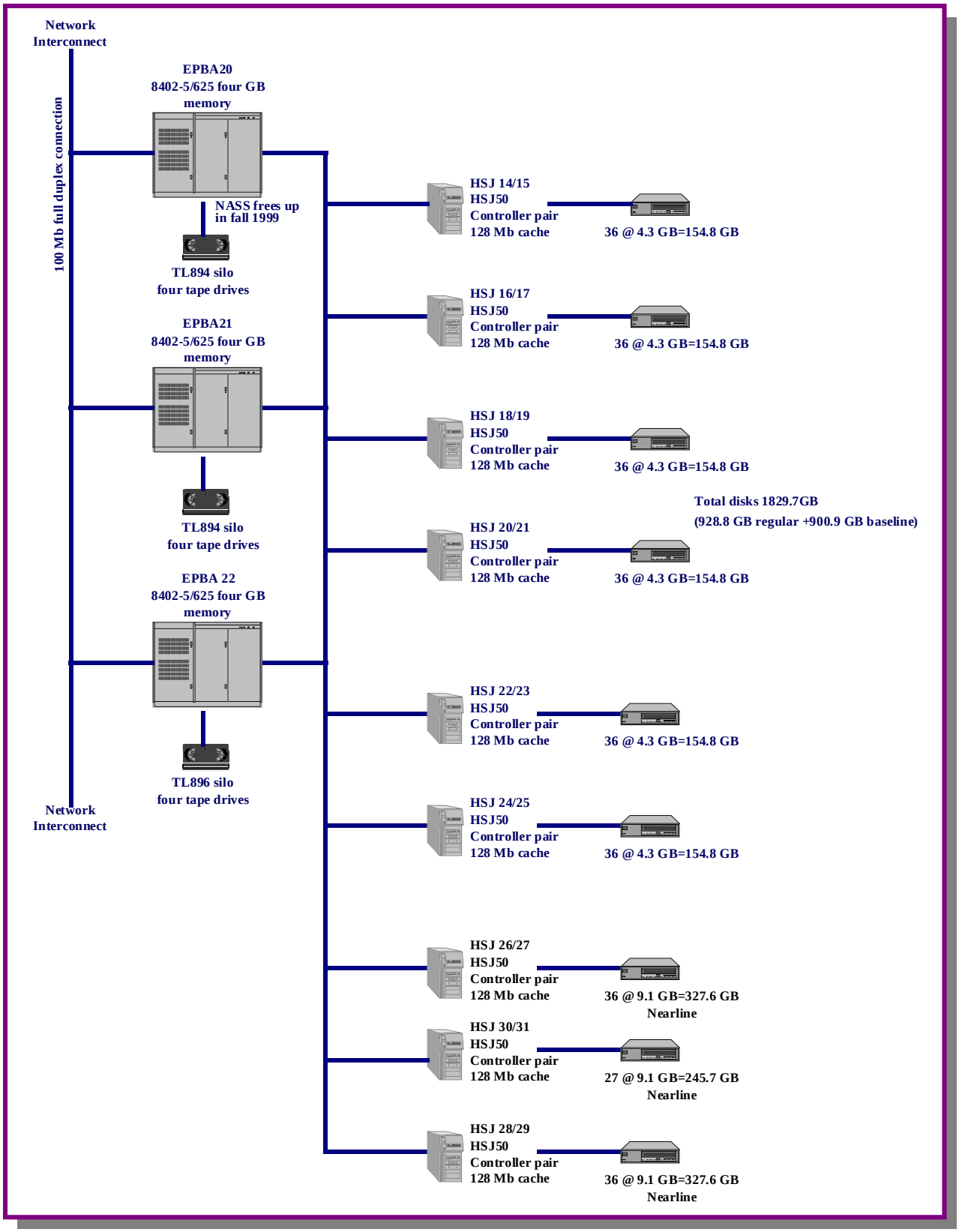


Figure 6: VMS C2 Production Cluster

We develop the final Foreign Trade Division statistics using the IT subsystems described below. Data capture systems developed for the hand-keying of paper documents are located in Puerto Rico and Jeffersonville, Indiana; all other IT systems are located at the Suitland, Maryland Headquarters.

Field Trade Division Data Capture Systems: this subsystem begins the monthly processing cycles for developing the monthly statistics. We have a variety of electronic Data Capture configurations presently in place; the following is a list of the major components:

- **Canadian Data Exchange;**
- **Foreign Trade Zone;**
- **Automated Broker Interface;**
- **Puerto Rico Office Transmissions;**
- **Automated Export Systems; and**
- **National Processing Center.**

These components use combinations of methods and procedures to get the export and import transaction level data to Headquarters for processing. Presently, we have methods in place using dial-in systems, U.S. Census Bureau T1 lines, and deliveries of tapes and other electronic media. The Foreign Trade Division will upgrade the telecommunications infrastructure to improve these operations.

Core Import and Export Processing System: this system consists of four standalone Pentium workstations (one for imports, one for exports and two backups). Custom COBOL programs written and maintained by Foreign Trade Division programmers perform the following:

- **editing data received from the Data Capture System;**
- **aggregating and summarizing import and export data; and**
- **creating various Foreign Trade Division databases and data products, including monthly CD-ROM data.**

Foreign Trade Division Local Area Network (LAN) System: once we verify production processing controls, we copy the data files to our LAN, using appropriate passwords and security procedures. We built the LAN using Novell and NT servers, with desktops running Windows 95. We anticipate replacing the desktop operating systems with NT sometime in the next two years.

Foreign Trade Division Press Release and Data Products: all press release files are run from data produced by the Core Import and Export Processing System, using a dedicated Local Area Network server and custom-written SAS programs; final corrections of the releases are made using Lotus III. Since we work with the Bureau of Economic Analysis to make joint releases, we transmit unreleased data to them using the encryption software package MailSafe, a stand-alone PC, modem, and a dial-in phone line. We also send encrypted data to the Council of Economic Advisors, using the same stand-alone system and the encryption software package Secret Agent.

type will rely on X-windows; subsequent prototypes may be Web-enabled.

Because all of the software we will use to develop this project is already covered under U.S. Census Bureau enterprise initiatives, we will not incur additional software costs.

We are also conducting ongoing research and expanding Research Data Centers. We provide access to economic microdata for internal and external researchers on approximately eight to ten Sun workstations and servers acquired specifically for this purpose. Located in Washington Plaza, each workstation is dedicated to a research project based on the needs of the individual project and researcher(s). This environment is highly flexible and scalable in that we can easily add or move standard CPUs, memory, and peripherals as changing circumstances dictate.

The software we use on these machines consists of a number of statistical packages, including SAS, Automatch, and Stata. Where possible, we have acquired these packages through ongoing U.S. Census Bureau contracts.

In addition to the ongoing economic research, we are now supporting projects that match economic and demographic microdata, providing a new means of analyzing U.S. Census Bureau data to better understand the people and the economy of the United States. Note that Current Population Survey data will be loaded into the second Economic Microdata prototype.

Over the last several years, we have attempted to provide more widespread access to researchers by opening Research Data Centers. Usually sponsored by a university, each of these centers acquires and supports its own computer systems. In most cases, this will involve a small number of personal computers networked with a UNIX workstation. In all cases, however, the center's computer staff and the ADP Security Branch have reviewed the computer environment proposals and security plans. This means that the only computer we require for this initiative is the one—a Sun Enterprise 3000 located in Washington Plaza II—used to support the Research Data Centers by providing data sets to be sent out. Acquired in late 1997, this machine will continue to be used until the end of its lifecycle sometime in 2001. The only other proposed configuration changes are CPU upgrades and the acquiring additional disk storage during FY 99.

2.1.2 Economic Program Area Progress Against Planned Milestones

Economic Program Area Milestones, FY 98

Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
Economic Census and Surveys					
Conversion of EPCVC3 VAX cluster to Alpha cluster (Development): Remove one VAX from cluster	05/98	07/98		07/98	Completed.
Conversion of EPCVC3 VAX cluster to Alpha cluster (Development): Convert VAX computers to Alpha onEPCVC2	04/97	09/98		09/98	Completed.

Economic Program Area Milestones, FY 99					
Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
Integration of Electronic Data Capture, Automated Data Processing, Correction and Analysis: Develop requirements and specifications in terms of hardware, software, and staff technical skills needed	06/99	08/99			In progress.
Office of the Chief Economist					
RDC Expansion: UCLA RDC opens	01/99	01/99	02/99	02/99	Completed.
Complete open systems migration	08/97	09/98		03/99	Completed.
RDC Expansion: Berkeley RDC open	01/99	01/99	04/99	04/99	Completed.
Economic Data Warehouse: Development Plan for Second Prototype	08/99	09/99			

Progress to Date:

Economic Census and Surveys

DEC Systems: in the past year, our primary objectives for the DEC systems were to move all of our DEC VAX applications to the DEC Alpha platform and to set up a DEC UNIX system for StEPS and other applications. To these ends, we have:

- converted three DEC VAX machines to Dec Alpha 8420s, each with 4GB of memory and dual processors which were upgraded to 625Mhz; these machines are clustered with a disk farm of 928GB work space and 900 GB of near line storage;
- implemented two large DLT silos for backup;
- upgraded our DEC development cluster from VAX to Alpha, now consisting of two Dec Alpha 4100s, each with 2GB of memory and 533Mhz processor; these machines are clustered with a disk farm of 232GB;

(continued)

- configured two UNIX 8420s (for production) with additional memory and 625zmhz dual processors; disk storage includes 1270GB of raided disk (resulting in 1066GB of usable space) and 436 GB of near line storage; each machine also has a DLT silo attached for backup; and
- configured a UNIX 4120/533mhz dual processor (for development) with 2 GB of memory and 456GB of raided disk resulting in 383GB of usable space; this machine also has a DLT silo attached for backup.

Economic Programs. A pilot project for two annual surveys will be conducted in FY 2000; if successful, the remaining annual surveys will move to IIS in FY 2001, and the indicators will move to IIS in FY 2002.

Standard Economic Processing System (StEPS): StEPS is a generalized system that we will use to process more than 100 Economic current surveys. It will include modules for mail file preparation, data capture update and reformatting, edit and imputation, interactive data review and correction, outyear analysis, tabulation, weighting and estimation, variance estimation management information system reports, and links to other systems. We completed three pilot surveys last year and work is now well underway for moving 47 additional annual surveys. Next year, we will move monthly and quarterly current surveys along with selected company-based annual surveys. We plan to move the current indicator surveys within the next three years.

StEPS will improve the timeliness for new surveys by eliminating analyst re-training and the development of customized survey-processing software. It will reduce the need for system maintenance resources and will standardize survey procedures used in data analysis and management information.

We will use standard hardware and UNIX operating systems that comply with the U.S. Census Bureau's IT Architecture. We are developing the system using SAS software, which is portable across a wide range of computer platforms. Using SAS will help us maintain StEPS, since ample expertise in SAS exists in the U.S. Census Bureau.

Economic Microdata Warehouse: this is a repository of easy to use business data that allows improved access by U.S. Census Bureau analysts and researchers. The warehouse makes it possible to link establishments' data to build an accurate picture of a firm, and it will improve the quality of our data products by increasing the consistency of responses and the accuracy of our imputation methods. It will also provide a single source for all our survey data in a consistent, simple format with standard definition. The computing environment consists of a UNIX server with very large amounts of on-line data storage. Desktop access is typically a PC running Windows 95, Windows NT or UNIX. SAS is used for the data warehouse framework for building a graphical front-end interface to allow end users to quickly build, download and manipulate data subsets; and for utilizing data mining tools to exploit the data. All components of the data warehouse system are standards-based.

Currently, this project is in the prototype testing and evaluation phase. We have completed the first working prototype and have made available to a diverse set of system evaluators.

The data warehouse prototype exists on a single POSIX server with a substantial amount of disk space (approximately 1250GB to begin; subsequent prototypes will most likely take advantage of hierarchical storage management technology). Data subsets are created here via intelligent data extraction tools and downloaded to local workstations or PCs for analysts' use.

Data exists in fully documented and labeled SAS data sets. We are using SAS to develop the software, thereby making both the data and the software highly portable. The only exception is the documentation server, which will be a Web-enabled Oracle database. For the current prototype, the software interface is the X11 Window system. Subsequent prototypes will be Web-enabled.

Foreign Trade Statistics

All major milestones have been completed or are progressing on schedule.

Governments Census and Surveys

Progress in FY 98 consisted of refreshing obsolescent technology. We upgraded network wiring to Category 5 to support 100-megabit transmission. We brought online two new servers to replace old machines and acquired 60 PCs to upgrade obsolescent equipment. We completed all activities on schedule.

Office of the Chief Economist

We completed all modules of the first data warehouse prototype on or ahead of schedule. We have loaded the next prototype on the new warehouse server for more advanced and widespread testing of new features. At the same time, the development staff is working on the first prototype of a documentation manager which will allow paper forms to become electronic records via scanning; we will also use the documentation manager to automatically generate metadata when new surveys are added. We have met all major milestones to date, although the second generation open systems migration was not completed until the end of March 1999. This was because a single HP workstation was being used for a long-term project and it was not feasible to move the project to another machine.

Economic Program Area Milestones, FY 00

Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
Economic Census and Survey					
Center for Economic Studies:; Research Data Center (RDC) – RDCs #3 and #4 open for business	**01/99**	**10/99**			**In progress.**
Electronic Data Collection: Develop Internet- based CSAQ for Economic Surveys	**03/99**	**12/99**			**In progress.**
DEC UNIX Systems: Re-deploy smaller UNIX servers from StEPS processing to be used for research and testing for projects such as 2002 Census redesign	**06/99**	**12/99**			**In progress.**
DEC UNIX Systems: Convert a DEC VMS 8400 to UNIX for additional surveys migrating to StEPS (NASS is not expected to finish until Fall 99, so the machine will not be available until then)	**09/99**	**12/99**			

Economic Program Area Milestones, FY 00					
Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
Telecommunications Upgrade	01/99	01/00			Presently negotiating with Customs for permission to install upgraded telecommunications lines.
AES Data Capture System Web Interface: Technically document the system, Create and implement documented training programs for Foreign Trade Staff	05/99	03/00			In progress.
Fully Integrated Data Products Order and Payment system: Work with administrative an technical staff members to (1) develop customer databases electronic order forms, payment forms (2) identify priority data products to be used in automated prototype (3) develop electronic methods to reconciles payments and process new or renewed subscription on onetime orders	12/99	03/00			
Expansion of Electronic Dissemination of Data Products and Trade Information: Create technical and training documentation for the delivery system	01/00	03/00			
Development of Electronic Interactive Analytical Tools for Foreign Trade Data Analysts: Establish lists of hardware, software, and technical skills needed to create prototype tools	01/00	03/00			
Expansion of Electronic Dissemination of Data Products and Trade Information: Train staff to produce and deliver customer trade information	04/00	06/00			
Integration of Electronic Data Capture, Automated Data Processing, Correction and Analysis: Develop and implement testing scenarios	01/00	06/00			
Integration of Electronic Data Capture, Automated Data Processing, Correction and Analysis: Develop and implement staff training programs	04/00	06/00			
Fully Integrated Data Products Order and Payment System: Create and test order and payment system prototype	04/00	09/00			
Governments Census & Surveys					
Review of current installed equipment	10/99	01/00			
Review of current technology	12/99	01/00			
Define requirements	02/00	04/00			
Submit purchase orders	05/00	07/00			

Office of the Chief Economist					
Economic Data Warehouse: Load Economic Census Data into Warehouse	08/99	06/01			
Review of Second Prototype	06/00	06/01			
Load SSEL	09/99	09/01			

Economic Program Area Milestones, FY 02

Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
Economic Census and Survey					
DEC UNIX Systems: Purchase and install one additional tape silo to backup the additional disk capacity that is being purchased for Census 2002	09/01	10/01			
Economic Data Warehouse: Development plan for production software	09/01	02/02			
DEC UNIX Systems: Upgrade I/O capabilities to support 2002 Census needs	01/02	03/02			
Electronic Data Collection: Acquire and install imaging/OCR equipment for 2002 Census	09/01	09/02			
Electronic Data Dissemination: Migrate "indicators" to IIS	10/01	09/02			
Office of the Chief Economist					
Development plan for production software	09/01	02/02			
Economic Data Warehouse: Load current Census Data into warehouse	08/99	06/02			
Economic Data warehouse: Load CPS Data into warehouse	06/00	06/02			

Economic Program Area Milestones, FY 03

Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
Economic Census and Survey					
Electronic Data Collection: Implement imaging/OCR for 2002 Census	09/02	09/03			
Office of the Chief Economist					
Economic Data Warehouse: Develop production software	02/02	02/03			

Fully Integrated Data Products Order and Payment System: plans are underway to design, develop and implement a fully functional orders and payments system for all Foreign Trade Division data products dissemination from within the division. The system will be interactive and will also maintain detailed customer information. It will provide budget management information system reports, reconcile late payments, and process new or renewed orders.

Governments Census and Surveys

There are no new initiatives planned for the period 2002-2005. Milestones consist of annual technology refreshments of the infrastructure.

2.1.3 Economic Program Area Performance Measures

Economic Program Area Performance Measures			
Performance Goal	**Performance Measure**	**Target Performance**	**Current Performance**
Economic Census and Surveys			
Development of Economic surveys into StEPS	Number of surveys deployed in StEPS	35 surveys by 09/2000	
Deployment of Economic surveys into Times Series Analytical Repository (TSAR)	Number of surveys deployed in TSAR	All economic surveys by 09/2000	
DEC UNIX systems availability	Percent uptime	95% uptime by 01/2000; 98% uptime by 09/2000	
DEC OpenVMS system availability	Percent uptime	99%	
User accounts on DEC UNIX systems	Number of accounts established	All user accounts established by 01/2000	
System crashes on DEC OpenVMS systems	Number of crashes	Less than 1 every 3 months and less than 4 hours duration	
System crashes on DEC UNIX systems	Number of crashes	Less than 1 every 3 months and less than 4 hours duration	
Foreign Trade Statistics			
Improve data availability through the Integrated Data Products Order and Payment System	Percent of FTD data products available online	2 by 03/2001	
Increase number of documents filed electronically using the AES electronic filing system	Convert the filing of 100 thousand paper SEDs filed monthly to AES	100% by 03/2000	

2.1.4 Economic Program Area Risks

Economic Census and Surveys

One risk is system complexity. The DEC systems support a variety of hardware components, software packages, peripheral systems and applications. Ensuring that all these components integrate and function properly is a daunting task. Upgrading one component or subsystem may cause others to malfunction. Extensive coordination is required between end users, programmers, Data Base Administrators, system managers, and hardware engineers. Also, our DEC UNIX environment is new and we lack experienced system managers. It is difficult to effectively manage such a complex computing environment. System failures could result in missed deadlines and late delivery of critical products.

Our risk mitigation strategies include the following:

- **rigorously testing new configurations and software releases on a test machine provided by the Bowie Computer Center;**
- **working with the Bowie Computer Center staff to ensure orderly upgrades (hardware and software) during non-prime hours and also ensuring that critical staff is available immediately after upgrades are deployed;**
- **working with the Bowie Computer Center and Economic divisions to schedule upgrades when critical work would be least affected;**
- **using DEC's technical experts to design, configure and install the UNIX Trucluster environment;**
- **hiring a full time, experienced DEC field engineer as a contractor to help install, maintain, inventory, and manage the configuration;**

(continued)

- **hiring consulting support for UNIX and VMS system management and data base administration;**
- **using standard software products (e.g. SAS) within the Economic Directorate; and**
- **establishing a secondary site, either at Bowie or offsite, to house backup silos storing periodic backups of highly critical data.**

Another risk is the lack of time to perform system administration functions. We must perform certain critical system administration functions, including backup, disk compression, and database reorganization, on a regular basis. Our batch processing often runs well into the night and prevents us from completing our backup operations on time, before users begin logging into the system in the morning. We often have to abort backup or the response times would be unacceptably high.

The risk of not having the most recent backup copy of data is that we may need to recover older data and then reconstruct all the processes that changed the data. This is a time-consuming and inexact process that may affect data quality and delay critical product releases.

Our risk mitigation strategies include the following:

- **ensuring that we always use the latest version of backup software;**
- **acquiring and deploying technologically advanced hardware to support and accelerate backup operations, such as DLT tape silos;**

(continued)

Foreign Trade Statistics

One risk is the lack of a skilled workforce. The Foreign Trade Division IT systems operations could be at risk because of the shortage of specially trained personnel.

Our risk mitigation strategies include the following:

- **assessing the future technical skills we will need; and**
- **providing the training to current employees who have the interest and talent to develop these skills.**

Another risk is telecommunications complexities. The Foreign Trade Division's IT systems are increasingly reliant on complicated telecommunication links for transferring incoming and processed data. All processing schedules are extremely tight. Any extended down periods for the communication links could seriously jeopardize the timeliness of the monthly United States merchandise trade Press Release and related data products.

Our risk mitigation strategies include working with technical staff members from Customs, the Canadian Embassy, and the U.S. Census Bureau's Telecommunications offices to develop relationships with technical personnel in appropriate organizations who will be able to quickly fix telecommunications organizational interface problems should they occur.

Another risk is the Foreign Trade Division Local Area Network (LAN). It is physically located in a climate-controlled, secure room, but could be seriously damaged by plumbing leaks, electrical failures and/or loss of air conditioning and humidity controls.

Our risk mitigation strategies include the following:

- **developing contingency production systems and staff training;**
- **establishing a redundant backup system at the Bowie Computer Center; and**
- **gradually developing redundant applications server capabilities and contingency equipment and procedures for Press Release production at Bowie.**

The last risk is Foreign Trade production workstations and desktop equipment. A lot of technical development and administrative work is performed using workstations and desktop equipment. Hard drives have become larger and larger. Data residing on these drives are not routinely backed up. Equipment malfunctions or hard drive crashes could result in the loss of development time. There is a provision to back up critical files but busy staff members do not always remember to do this.

Our risk mitigation strategies include the following:

- **using the new CD-ROM online replicating systems to identify and routinely backup critical files on CD-ROMs; and**
- **exploring methods of routinely transferring data to servers for backup.**

Office of the Chief Economist

We have identified three major areas of risk:

- **the risk of network failure;**
- **the inability to attract and keep qualified staff; and**
- **the risk of not being able to include historical data in the microdata warehouse because of inconsistencies due to poor data documentation or the lack of institutional knowledge.**

We have minimized the first risk by increasing the redundancy and robustness of our network environment. The second risk is critical in that the only staff trained to develop this project must share their time among other projects. We can only address the third risk by concentrating as much institutional expertise as possible on the task of "scrubbing" historical data before we include it in the microdata warehouse.

There are also, of course, risks associated with the success of this project. One such risk is that the data warehouse will be so successful that the need for its use will outstrip the existing computing and network resources put in place for its use, requiring a massive investment in upgrades. We have minimized this risk by installing as robust a networking environment and as scalable a compute/file server as possible. Another such risk is that although the designers of the warehouse have worked closely with other U.S. Census Bureau offices involved in similar tasks, the warehouse will eventually be incompatible with any other U.S. Census Bureau data warehouse. The only way to minimize this risk is to continue to work closely with other groups involved in projects.

2.1.5 Economic Program Area References

The Economic program area is supported by the following planning documents:

- **Budget submission for FY 2001, dated June 1999;**
- **1999 Strategic IT Plan dated December 18, 1998;**
- ***VMS to UNIX Migration*, Requirements Initiative ECON9901, dated November 15, 1998;**
- ***POSIX Resources*, Requirements Initiative EF01-9801, dated January 30, 1998;**
- ***IT Resources for Analytical Research*, Requirements Initiative EF01-9705, dated August 12, 1997; and**
- ***UNIX Resources for Migration*, Requirements Initiative EF02-9702, dated May 29, 1997.**

3.0 Economic Program Area Infrastructure

3.1 Detailed Description of Economic Program Area Infrastructure

Economic Census and Surveys

Figures 8,9, and 10 on the following pages depict the LAN infrastructure configuration.

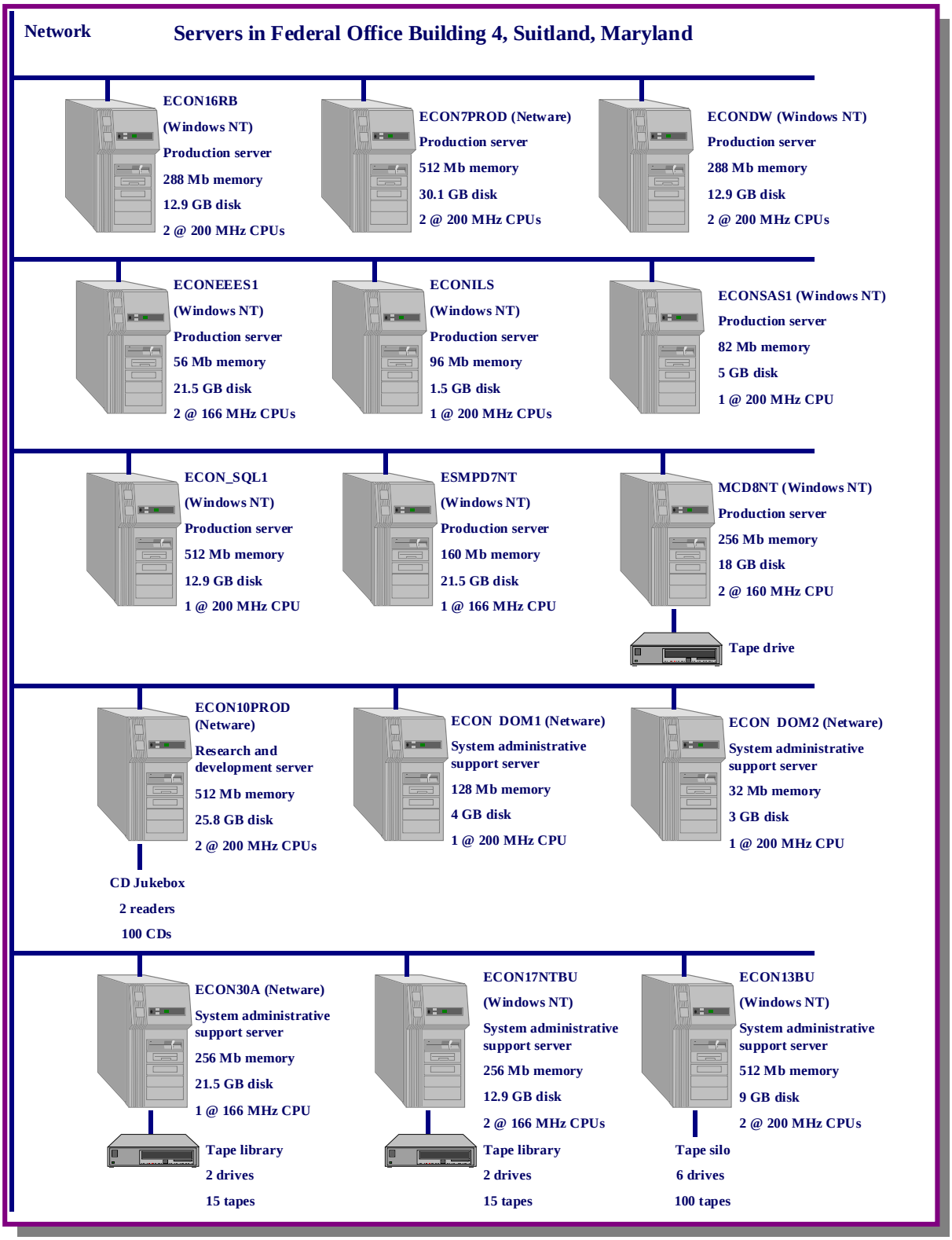


Figure 9: Local Area Network Servers in Federal Office Building 4

provide more data for use on the Internet and the U.S. Census Bureau's Internet. Foreign Trade Division will upgrade the LAN to Novell 5x when this software becomes available. This portion of the LAN services includes more than 210 Pentium microcomputers, 27 printers, 2 color print systems, CD-ROM servers, scanners, and a multitude of peripheral devices (CD-ROM, 4mmDAT, zip drives, etc.) used to develop Foreign Trade statistics.

Foreign Trade Division is working to create redundant LAN capabilities. During FY 98, we place redundant storage backup equipment at the Bowie Computer Center. After much testing, this redundant system is working well and additional redundant APPS servers are being placed at the U.S. Census Bureau Headquarters and Bowie sites. A RAID-5 Hot Swap mass storage server will be used; each server has a 59GB hard drive. High-availability server software will run on both servers. This software will replicate any software changes so both servers will remain identical, balancing the load usage should the Headquarters server become overused, and immediately switching to the Bowie server if the Headquarters server fails. The goal is to not inconvenience users because of failed equipment.

Microcomputers, Peripherals and Other Equipment: we continually update our IT systems and subsystems by refreshing equipment and making new capital purchases. During the later part of FY 98 and the first months of FY 99, we purchased and installed approximately 100 new state-of-the-art PCs (300 to 450 MHz Pentium). We routinely order all RAM with 128MB or more in anticipation of continued software demands for more and more RAM. We order all new computers with 10GB hard drives; we have honored some special user requests for two hard drive computers (20GB of hard drive space). We have also ordered other special computers with multiple 9GB SCSI3 hard drives and as much as 256MB of RAM.

Continual requests have been made for upgraded printers. During the later part of FY 98, we purchased and installed a CANON Color System complete with a specialty server for the system. The Foreign Trade Division is beginning to extensively use this system as part of the Press Release production procedures. Further use of this color system and the division's laser and inkjet printers creates Power Point transparencies and Foreign Trade brochures for marketing and educational tools. We have replaced six of the 27 HP laser printers with updated models; we have upgraded other HP printers to include full duplex capabilities, thus cutting the continually escalating use of paper. Requests for and use of laptop computers continues to increase: this past year, Foreign Trade Division ordered 10 additional laptop computers to use along with audiovisual equipment, for outside presentations and meetings. A CD-ROM jukebox server with space for 600 CD-ROMS provides additional online access to Foreign Trade data.

During the first months of FY 99 we purchased two complete turnkey RIMAGE CD-ROM duplication and publishing systems. This equipment gives the Foreign Trade Division additional tools to backup critical data on CD-ROMS and to quickly make duplicate CD-ROMS for both internal and external customers. Each system can duplicate four CD-ROMS containing 650MB of data in approximately 17 minutes; previous single-drive duplicating equipment took 45 minutes to duplicate one CD-ROM containing 650MB of data. The RIMAGE systems also contain equipment to

Data Monthly Production Workstations

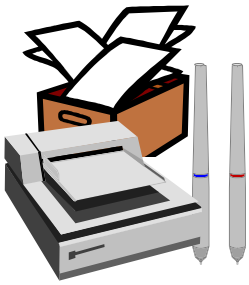
four production

one imports

one exports

two backups

Data Capture



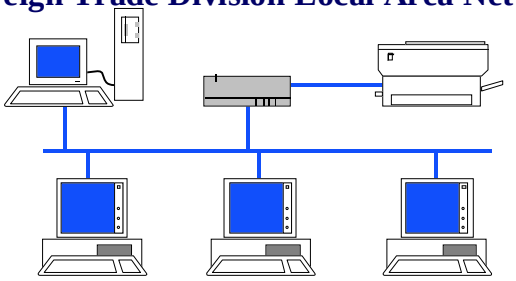
six dial-in (five AFTZP, one Canada)

one T-1 line for Canada

one for export bulletin board

one dial-in Customs

Foreign Trade Division Local Area Network



24 Novell Servers (22 production, two backup servers)

six NT servers (two DHCP, two production, one print server, one CD-ROM library)

Office Automation

210 desktop Pentium PCs

27 printers

two color systems

Press Release Transmittal Equipment

Windows95 Pentium workstation for transmittal to Bureau of Economic Analysis and Council of Economic Advisers

Encryption software (Secret Agent and Mail Safe)

Figure 11: Foreign Trade IT Infrastructure

Economic Program Area Infrastructure Milestones, FY 99					
Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
Foreign Trade Statistics					
SAS Executive Milestone Overview: Development of Historical SAS database and related analytical tools – Production testing and staff training	08/98	10/98		11/98	Completed.
DPD Automation: System upgrade of DPD office IT equipment – redesign imports processing and implement new processing procedures	01/98	10/98		10/98	Completed.
DPD Automation: system upgrade of DPD office IT equipment – redesign exports processing and implement new processing procedures	02/98	03/99		03/99	Completed.
Standardization and Modernization of LAN PCs: Install Common User Interface (CUI) /Release new versions	09/97	06/99		06/99	New CUI version released 06/99.
LAN and PC Modernization – Economic Document Management system: Upgrade to Cyber DOCs 2.5	07/99	07/99			
Office of the Chief Economist					
Install Y2K-compliant PC operating systems	12/98	06/99		06/99	Completed.
Procure and install PC backup software	02/99	03/99		03/99	Completed.

Economic Program Area Infrastructure Milestones, FY 00					
Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
LAN and PC Modernization					
Replace one quarter network printers	01/00	09/00			
Replace one third desktop PCs (HQ)	01/00	09/00			
Replace one sixth desktop PCs (Jeffersonville)	01/00	09/00			
Start with one tenth replacement then continue with replacement of one third of the desktop monitors each year (HQ and Jeffersonville)	01/00	09/00			
Production LAN server replacement: Start with five then continue with the replacement scheme only purchasing 3 larger servers each year. This will slowly reduce the number of reverse we have and centralize management and processing on fewer/larger machines. (HQ and Jeffersonville)	01/00 (5)	09/00			
Age replacement of Laptop PCs, starting in 2000 with 20 then replace 25% each year after that	01/00 (20)	09/00			

Economic Program Area Infrastructure Milestones, FY 01					
Description	Estimated		Actual		Progress to Date
	Start Date	Finish Date	Start Date	Finish Date	
LAN and PC Modernization					
Production LAN server replacement: Start with five then continue with the replacement scheme only purchasing 3 larger servers each year. This will slowly reduce the number of reverse we have and centralize management and processing on fewer/larger machines. (HQ and Jeffersonville)	01/01 (3)	09/01			
Age replacement of Laptop PCs, starting in 2000 with 20 then replace 25% each year after that	01/01 (10)	09/01			

3.4 Economic Program Area Infrastructure Risks

Economic Census and Surveys

One risk is the difficulty hiring and retaining staff with specialized Local Area Network (LAN) technical skills. LAN managers knowledgeable in both Novell NetWare and Microsoft Windows NT network operating systems, as well as Microsoft SQL, and other telecommunication skills, are very difficult to acquire at the salary levels the government can offer. Also, because IT salaries continue to rapidly rise, we expect to lose experienced staff to private industry. Contracting is an alternative, but contractors must know the subject matter and understand how the Economic program area processes critical deadline production for monthly surveys; otherwise, we jeopardize data quality and risk missing critical deadlines.

Our risk mitigation strategies include the following:

- **relying on contractors to fill in skill gaps;**
- **transferring some support functions, such as help desk and document systems management, to the IT Directorate;**
- **deploying larger capacity systems to reduce system management burden and to create a more centralized management structure;**
- **deploying automated system management tools, such as automated, remote software distribution;**
- **continuing to research new technology and tools to make our systems more robust, reliable and easier to manage; and**
- **investigating seat management in cooperation with the IT Directorate.**

Another risk is telecommunication infrastructure reliability and robustness. Since much of our critical processing is done "decentrally" in several remote locations, (Jeffersonville, Bowie, Headquarters), we rely on a stable, reliable Local Area Network and Wide Area Network. Analysts and clerks in Jeffersonville interactively perform much of our critical work; disruptions to the telecommunications network during critical processing periods increases the risk of failing to meet our press release deadlines.

Our increasing workload and use of the U.S. Census Bureau's LAN and WAN will necessitate upgrades to the enterprise telecommunications infrastructure. We rely on the IT Directorate's Telecommunications Office to translate our processing requirements into appropriate network equipment upgrades in order to maintain the current level of service.

Our risk mitigation strategies include the following:

- **keeping communications lines open between Economic LAN support staff and IT Directorate staff to ensure our needs are quickly met;**
- **developing Service Level Agreements to clearly delineate telecommunications support responsibilities and improve quality of service;**
- **installing redundant equipment and systems to achieve maximum network availability; and**
- **sharing our research findings with the IT Directorate to assist in selecting the most appropriate software, hardware and operating systems for the U.S. Census Bureau.**

3.5 Economic Program Area Infrastructure References

The Economic program area's infrastructure is supported by the following planning documents:

- **Budget Submission for 2001, dated June 1999;**
- **1999 Strategic IT Plan, dated December 31, 1998, pages 69-72,95;**
- ***Enterprise Printer Resources*, Requirements Initiative PRMAP-9701, approved May 13, 1998;**
- ***Enterprise Telecommunications Resources*, Requirements Initiative IT02-9701, approved September 30, 1997; and**
- ***Enterprise Personal Computer Management and Acquisition Plan*, Requirements Initiative PCMAP-9601, approved December 5, 1995.**